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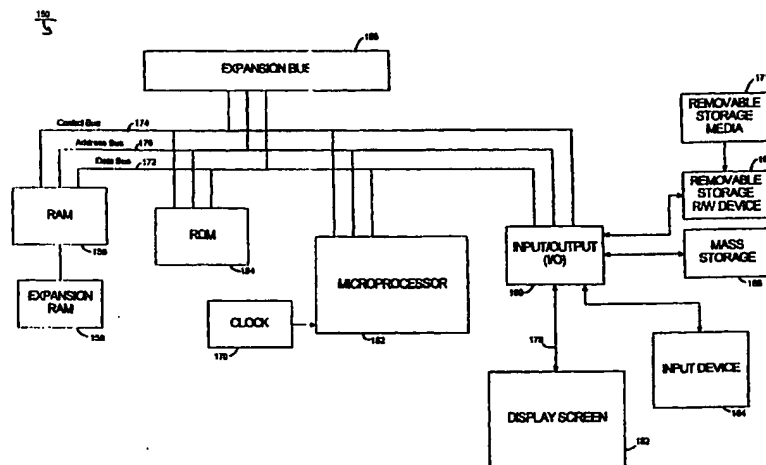
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- (71) Applicant: KINKO'S VENTURES, INC. [US/US]; 255 West Stanley Avenue, Ventura, CA 93002 (US).
- (72) Inventors: CARLSON, Michael, W.; 1686 Kenewa Street, Ojai, CA 93023 (US). TAPSCOTT, Joseph, C.; 1209 Cypress Point Lane #202, Ventura, CA 93003 (US). WALDEN, George; 5140 Via Calderon, Camarillo, CA 93012 (US).
- (74) Agents: SHAPIRO, Steven, E. et al.; Mitchell, Silberberg & Knupp LLP, 11377 West Olympic Boulevard, Los Angeles, CA 90064 (US).
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(54) Title: PERFECT BOOK BINDING SYSTEM



(57) Abstract: A system for automating the creation of a printing master and a cover template for a document so that the cover would perfectly wrap around the document to form a book. The system prepares the document for binding by setting up page-by-page printing instructions, scaling the document if required, and setting up a template for a cover. The system sets up printing instructions for the document by collecting instructions for each page "range" in the book. The operator of the application may specify the type of paper to be used for each of the page ranges and the printing format. Once the page range printing instructions have been specified, the system next determines the size requirements for the cover based on the size of the original file and the thickness of the document, which is based on the type of paper used and the number of pages involved for each type of paper. The application optimizes ("scales") the text and page size to fit within the cover. Finally, the system next creates three output files: (1) the formatted document, (2) a template for the cover, and (3) a job summary file.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

PERFECT BOOK BINDING SYSTEM

BACKGROUND OF THE INVENTION

5 Field of the Invention

The present invention relates to a system for reconfiguring documents and for creating covers for binding the documents in a book form.

10 Description of the Prior Art

Traditionally, if a customer wanted to bind a document in a book form, the customer had to take the document to a worker at a book binding service. The worker had to manually format the cover for the book, place the title on the cover and reconfigure the original document provided by the customer. The worker also had to manually calculate the size of the cover, especially the spine of the cover, so that
15 the cover would perfectly bind the document.

Because of the lengthy process and the labor involved in binding books, most book binding services required minimum order quantities to justify the cost and the time involved in binding documents in a book form. Such minimum order quantities requirement prevented the customers who only needed few copies of the book from
20 seeking a book binding service. Furthermore, customers did not really have a chance to examine the books until the books were actually bound, so that if a customer did not like the book or wanted to make a change, the book had to be rebound, leading to higher costs for binding books.

25 SUMMARY OF THE INVENTION

The present invention addresses the foregoing problems by allowing a user of the invention to reconfigure, create and view the document and the cover for the document before the document is bounded in a book form.

The present invention automates the creation of a printing master and a cover
30 template for a document so that the cover will perfectly wrap around the document to form a book. The application, in accordance with embodiments of the present

invention, prepares the document for binding by setting up page-by-page printing instructions, scaling the document if required, and setting up a template for a cover.

First, the application sets up printing instructions for the document by collecting instructions for each page "range" in the book. A range is a set of
5 contiguous pages that are all printed in the same manner. The operator of the application may specify the type of paper to be used for each of the page ranges and the printing format.

Once the page range printing instructions have been specified, the application next determines the size requirements for the cover based on the size of the original
10 file and the thickness of the document, which is based on the type of paper used and the number of pages involved for each type of paper. The application optimizes ("scales") the text and page size to fit within the cover. If the customer desires, the application also attempts to fit two copies of the document on a page in order to save costs.

15 Finally, the application next creates three PDF files: (1) the formatted document, (2) a template for the cover that can be opened in a graphics program like Freehand or Pagemaker to apply text and graphics, and (3) a job summary file.

The operator may print the formatted document and the cover template and bind the print out to form a book. The job summary file can be printed to accompany
20 the job through printing and binding.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of a general purpose computer system that may be
25 used implement the system in accordance with embodiments of the present invention.

Fig. 2 is a flow diagram illustrating an overview of a system in accordance with a representative embodiment of the present invention.

Fig. 3 illustrates a PDF Info screen for gathering information about a customer
30 and an input file submitted by the customer in accordance with a representative embodiment of the present invention.

Fig. 4 illustrates a Page Info screen for entering information about page ranges within the book and other specifications in accordance with a representative embodiment of the present invention.

Fig. 5 illustrates a Scaling screen for scaling the pages of the book in accordance with a representative embodiment of the present invention

Fig. 6 illustrates a Job Summary screen in accordance with a representative embodiment of the present invention.

Fig. 7 illustrates a job summary file output in accordance with a representative embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following description explains representative embodiments of the invention. While the following embodiments are provided to explain the nature of the invention, it should be understood that the present invention is not limited only to these embodiments.

Operating Environment

Figure 1 illustrates a block diagram of a general purpose computer system that can be used to implement the embodiments of the present invention. Specifically, Figure 1 shows a general purpose computer system 150 for use in practicing the present invention. As shown in Figure 1, computer system 150 includes a central processing unit (CPU) 152, read-only memory (ROM) 154, random access memory (RAM) 156, expansion RAM 158, input/output (I/O) circuitry 160, display assembly 162, input device 164, and expansion bus 166. Computer system 150 may also optionally include a mass storage unit 168 such as a disk drive unit or nonvolatile memory such as flash memory and a real-time clock 170.

CPU 152 is coupled to ROM 154 by a data bus 172, control bus 174, and address bus 176. ROM 154 contains the basic operating system for the computer system 150. CPU 152 is also connected to RAM 156 by busses 172, 174, and 176. Expansion RAM 158 is optionally coupled to RAM 156 for use by CPU

152. CPU 152 is also coupled to the I/O circuitry 160 by data bus 172, control bus 174, and address bus 176 to permit data transfers with peripheral devices.

I/O circuitry 160 typically includes a number of latches, registers and direct memory access (DMA) controllers. The purpose of I/O circuitry 160 is to
5 provide an interface between CPU 152 and such peripheral devices as display assembly 162, input device 164, and mass storage 168.

Display assembly 162 of computer system 150 is an output device coupled to I/O circuitry 160 by a data bus 178. Display assembly 162 receives data from I/O circuitry 160 via bus 178 and displays that data on a suitable screen.

10 The screen for display assembly 162 can be a device that uses a cathode-ray tube (CRT), liquid crystal display (LCD), or the like, of the types commercially available from a variety of manufacturers. Input device 164 can be a keyboard, a mouse, a stylus working in cooperation with a position-sensing display, or the like. The aforementioned input devices are available from a variety of vendors
15 and are well known in the art.

Some type of mass storage 168 generally is considered desirable. However, mass storage 168 can be eliminated by providing a sufficient mount of RAM 156 and expansion RAM 158 to store user application programs and data. In that case, RAMs 156 and 158 can optionally be provided with a backup battery to
20 prevent the loss of data even when computer system 150 is turned off. However, it is generally desirable to have some type of long term mass storage 168 such as a commercially available hard disk drive, nonvolatile memory such as flash memory, battery backed RAM, PC-data cards, or the like.

A removable storage read/write device 169 may be coupled to I/O
25 circuitry 160 to read from and to write to a removable storage media 171. Removable storage media 171 may represent, for example, a magnetic disk, a magnetic tape, an opto-magnetic disk, an optical disk, or the like.

30 In operation, information is input into the computer system 150 by typing on a keyboard, manipulating a mouse or trackball, or "writing" on a tablet or on position-sensing screen of display assembly 162. CPU 152 then processes the data under control of an operating system and an application program, such as a

program to perform steps of the inventive method described above, stored in ROM 154 and/or RAM 156. CPU 152 then typically produces data which is output to the display assembly 162 to produce appropriate images on its screen.

Expansion bus 166 is coupled to data bus 172, control bus 174, and address bus 176. Expansion bus 166 provides extra ports to couple devices such as network interface circuits, modems, display switches, microphones, speakers, etc. to CPU 152. Network communication is accomplished through the network interface circuit and an appropriate network.

Suitable computers for use in implementing the present invention may be obtained from various vendors. Various computers, however, may be used depending upon the size and complexity of the required tasks. Suitable computers include mainframe computers, multiprocessor computers, workstations or personal computers. In addition, although a general purpose computer system has been described above, a special-purpose computer may also (or instead) be used at the document production locations, processing facility and/or remote terminals.

Customer and Input File Information

Figure 2 is a flow diagram illustrating an overview of the processing steps performed according to a representative embodiment of the invention. The embodiments of the present invention may be operated as a software application on a general purpose computer such as the computer system 150. For example, the process steps illustrated in Figure 2 can initially be stored on mass storage device 168, downloaded into RAM 156, and then executed by microprocessor 152 out of RAM 156.

In step 201, the application gathers various information about the customer and the input file submitted by the customer. Before the information about the customer and the input file is gathered, the application already has certain information available. The application has a database of available papers to be used for printing the input file and for covering the printed document. In preferred embodiments of the present invention, the application checks the available stock of paper and updates the database, so that the database shows the actually available

paper in supply. The data in the database is a simple text file and in preferred embodiments of the present invention, the dimensions and the thicknesses of the available papers are in millimeters. The following example shows a sample format:

- 5 width|height|sizelabel|branchcodelabel|thickness|printablesides|mediacategory|name
 215.90|279.40|Letter|E1|0.14|2|0|Ivory Royal Linen
 width = width of the paper;
 height = height of the paper;
 sizelabel = label for a particular size, e.g., "Letter", "Legal", etc.;
- 10 branchcodelabel = label for a particular store branch;
 thickness = thickness of the paper;
 printablesides = whether only one side is printable or both sides are printable;
 mediacategory = Each paper has a mediacategory: Paper, Cardstock, or
 Special Stock. The mediacategory is displayed in the Page Info screen, as
- 15 explained below;
 name = name of the type of paper;

The application further has a simple text configuration file that contains the following values:

- 20 **Default Units Metric**
 A string that should be "true" if the default units should be metric, i.e. millimeters, or "false" if they should be English, i.e. inches.
- Media Categories**
 A comma separated list of strings that correspond to the mediacategory values in the paper database. The first string will be
- 25 displayed for papers that have a mediacategory of 0. The second string will be displayed for papers that have a mediacategory of 1. And so on.
- Default Max Cover Size**
 The "sizelabel" of the maximum cover size available at the time. The
- 30 Max Cover Size combo box on the PDF Info screen will default to this

value, but the operator of the application can select another value that the operator desires.

Figure 3 illustrates a PDF Info screen 220 for gathering information about a customer and the input file submitted by the customer, as shown in step 201. The screen 220 functions as a user interface screen for the application. The screen 220 is divided into two sections, a section 230 which has different input fields regarding the input file and the customer and a section 225 which provides an explanation and instruction about each of the fields in the section 230. In preferred embodiments of the present invention, the input files are submitted in a Portable Document Format (PDF) by Adobe Systems, although other types of data format may be used for the input files. However, the PDF format presently provides the greatest overall convenience and flexibility for end users because the PDF file format provides greatest amount of information and convenience to the application.

A field 231 is a name field used to identify the particular job. The application expects a name in the field 231 to identify a particular job. In the field 231, the customer's name is usually entered by the operator of the application to identify the particular job.

A field 232 is a select file field for entering a name of the PDF file to be used as the input file. The name of the file along with the directory path are entered into the field 232. The operator may select the input file by clicking on the "Browse" button 233 positioned next to the field 232. Clicking the Browse button 233 brings up a file selection dialog, which may list the files in a default directory. However, the operator may change the directory path to select files in other directories. After the selection of the input file, the application will "validate" the file. A PDF file is valid if all pages in the file have the same width and height, including dimension and orientation.

A field 234 is a units field for selecting a desired unit system. In preferred embodiments of the present invention, the field 234 is hard coded to allow two choices: "Millimeters" or "Inches". The application will display all dimensions and

values in the system chosen by the operator. The configuration file mentioned above tells the application which of these two is the default value.

A field 235 is a non-editable field that displays the selected file's page dimensions in the currently selected unit.

5 A field 236 is a margins field with four text entry fields 236a,b,c and d. The fields 236a,b,c and d are used to enter the margins of the selected input file. The operator may enter the desired margins for every side of the input file document. In preferred embodiments, the application accepts a floating-point number that contains at most 4 characters such as "99.9". The application will not advance to the next
10 screen if the margins are greater than the size of the document.

A field 237 is a print "2-Up" field. The operator may select either "Yes" or "No" to choose whether the pages of the document should be printed in "2-Up" format. In the "2-Up" format, two pages of the document are printed on the same side of the same piece of paper. In other words, two images of one page of the document will
15 be printed on the same side of the same piece of paper so that two books can be formed from a single printing. For example, two images of page 6 of the document will be printed on the same side of the same piece of paper. If the "Yes" option is chosen by the operator, the application will check to see if it is possible to print two pages on the same side of the same piece of paper. The calculation, however, will
20 be made later when other pertinent information are entered into the application in the Page Info screen and the Scaling screen, as explained in detail below.

A field 238 is a maximum cover size field. The field 238 will default to the maximum cover size specified in this application's configuration file, but the operator may select a different value by selecting a choice after clicking on the down arrow.
25 The list of choices is generated by the application by pulling out all the unique sizelabels from the paper database, e.g., "Letter", "Legal", "11x17", A-4.

Tabs 221, 222 and 223 are Help, Reset and Quit tabs, respectively, located at the top of the screen 220 that can be clicked at any time to bring up certain dialog screens. The Help tab 221 will start a browser displaying the application's Help
30 index page. The Reset tab will display an "Are you sure?" dialog. If the operator clicks the Yes button, it will reset the application, (i.e. it will make the PDF Info

Screen 220 the active screen and reset the fields to their default startup values.) The Quit tab 223 will display an "Are you sure?" dialog. If the operator clicks the Yes button, it will quit the application.

5 Tabs 224, 226, 227 and 228, which are located on the side of the screen 220, can be clicked at any time to bring up other operational screens in the application, such as the Page Info, Scaling and Summary screens. The "Next" button 239 can be clicked to advance into the next operational screen.

Specification

10 Figure 4 illustrates a Page Info screen 250 for entering information about page ranges within the book and other specifications as shown in step 202. A page range is a contiguous set of pages that will be printed on the same paper type and have same "sidedness" (i.e. all pages within the range will be printed either single-sided or double-sided). In other words, pages of the book within a same page range share
15 the same characteristics such as paper type and "sideness." The book can be divided into many different page ranges. For example, the user might want pages 1 through 5 printed single-sided on a yellow cardstock, pages 6 through 50 printed double-sided on white paper, and pages 51 through 55 printed single-sided on blue cardstock.

20 The screen 250 also functions as an user interface screen. Basically, in the Page Info screen 250, the operator may choose the paper type and the "sidedness" for each of the specified page ranges in the book. The Page Info screen 250 is divided into two sections 255 and 260. The section 255 provides an explanation and an instruction about each of the fields in the section 260, and the section 260
25 contains the different input fields.

 In preferred embodiments of the present invention, the application will look at the width and the height of the original input PDF file and find the smallest size paper on which the document can be printed 1-up. The application will then display all paper types that are available in this size. (Only after the operator has chosen the
30 papers for the document and scaled the document will the application see if the same types of papers are available in the larger sizes necessary to print 2-up.) If the

operator leaves the Page Info screen 250 without specifying all pages in the input PDF file, a warning dialog will be displayed that will allow the operator to return to this screen or ignore the warning.

A table 261 is a page range table that displays the current set of page ranges that will be placed in the book. The table 261 has three columns, which are "Page Range", "Paper Type" and "Sided" and may have numerous rows separated into different page ranges. The "Page Range" column lists the specified page ranges in the book, the "Paper Type" column lists the paper type for each of the page ranges, and the "Sided" column specifies whether the pages are to be printed in a single sided format or a double sided format. The page numbers are relative to the input document. For example, if the first page range is "3-10", then the first pages in the book will be pages 3 through 10 of the input document.

The rows in the table 261 are not directly editable. The table 261 may be edited by entering in the pertinent information in the fields listed below the table by using the "ADD", "MODIFY" and "DELETE" buttons. The table 261 also has a scroll bar for scrolling up and down the table.

The paper type string displayed in the "Paper Type" column of the table 261 is the concatenation of the following strings: branchcodelabel + " - " + name + " " + mediacategory, e.g., "E4 - Ivory Royal Linen Paper". Medicategory is one of: Paper, Cardstock, or Special Stock. The mediacategory is actually an integer from the paper database such as 0, 1 or 2. The strings that correspond to the integers will come from a configuration file so that the current strings may be changed or new strings may be added later on. (The numbers must always be sequential starting with 0 though.) The list of papers will come from a flat text file.

The "Sided" column displays either the string "Single" or "Double" to specify whether the pages in the range should be printed single-sided or double-sided.

Whenever the operator selects a row in table 261, the parameter values from the selected row, (Page Range, Paper Type, Sided), are displayed in the fields below the table 261. The operator can then delete the selected row, modify the values, or add a new row. By default, the table 261 is empty until the operator adds to the table

261. The operator may start adding to the table by entering in the pertinent information and clicking on the "Add" button, as explained below.

5 A field 262 is a page range field for entering the page number of the first page of the page range that is being added or modified, and the last page of the page range that is being added or modified. A field 262a accepts the first page and a field 262b accepts the last page. These two fields will take an integer of up to 4 digits. The first value must be less than or equal to the last value. Entering only the first page number is the same as entering the same number in the first and last page number, e.g., "5" is the same as "5 - 5".

10 A field 263 is a paper type field which allows the operator to choose the type of paper for a particular page range from a list of available paper types that are of the current paper size. The current paper size is the size of paper needed to print the input document in a 1-up format. The operator may choose the desired paper type by clicking on the arrow to bring up a list of the paper types.

15 A field 264 is a field that allows the operator to choose either "Single" or "Double" sided printing. These choices are hard coded. The default value is "Double".

The Add button 265 allows the operator to add a new row to the table 261. When the operator clicks the Add button 265, a new row is added to the table 261
20 that contains the values entered in the fields 262, 263 and 264. However, the application does not allow overlapping page ranges.

The Modify button 266 allows the operator to modify a selected row. When the operator selects a row in the table 261, the button 266 is sensitized, and the selected row's values are displayed in the fields below the table 261. If the operator
25 changes the values in the fields and then clicks the Modify button 266, the selected row's values will be replaced by the newly entered values.

The Delete button 267 allows the operator to delete a row in the table 261. When the user selects a row in the table, the button 267 is sensitized and the selected row's values are displayed in the fields below the table. If the operator
30 clicks the Delete button 267, an "Are you sure?" dialog will be displayed. If the operator clicks the Yes button, the selected row will be deleted from the table.

The Back button 268 and the Next button 269 allow the operator to move to other screens in the application. After entering in all necessary page ranges for the book, the operator may proceed to the next screen.

5 Scaling

Figure 5 illustrates a Scaling screen 280 for scaling the pages of the book, as shown on step 203. The screen 280 functions as another user interface screen for the application. After the operator decides on the page ranges, the paper type for each of the page ranges and the print side for each of the page ranges in the book, 10 the application proceeds to the Scaling screen 280 that has two sections 285 and 290. The section 285 provides an explanation and an instruction for using the Scaling screen 280.

The Scaling screen 280 is used to scale the pages of the book. In certain cases, a customer's book may not fit on an available cover sheet because the paper 15 size chosen by the customer may be too big to fit on any of the available cover sheet. In order to fit the customer's document on the largest available cover sheet, the application might have to scale down the dimension of the customer's book. For example, if the customer has an 8.5x11 document, but the largest cover will only allow 8x11 pages, the application will suggest a scaling factor of 0.94 so that the 20 document will fit completely on the available cover sheet. The application will still print the document on 8.5x11 sheets of paper, but the printed text area is reduced by a scaling factor of 0.94 so as to allow the operator to trim the sheets physically after the document is printed. Since the documents sheets are trimmed, the cover, which only allows 8x11 pages, will perfectly wrap around the document and form a 25 book.

However, the customer may want to scale the document back up to the full size of 1.0 because the customer may not want to have a reduced text area. In such cases, the customer is trying to print the document on pages that are too small to hold the full size document. The application handles such situations by reducing the 30 size of the margins around the text area. The original size of the text area will be preserved, but the size of the margins are reduced so that the printed sheets can be

trimmed physically to fit the available cover sheet. In other words, if the available cover sheet is not large enough to cover the document adequately, the customer needs to either reduce the printed text area by scaling the text area or reduce the margins around the text area. Thus, scaling allows documents to be bound in a book form even when the available cover sheet may not be adequately sized to cover the original document. In certain cases, the customer may want to intentionally scale down or up the size of the document to form a different size book. For example, the customer may want to form a paper back sized book. By scaling the pages, a paper sized book can be easily formed.

10 The section 290 includes a document page layout 281. Borders 282a,b,c and d of the layout 281 represent the dimension of a sheet of paper on which the document will be printed. Borders 283a,b,c and d represent the dimension of a page from the document. Borders 284a,b,c and d represent the dimension of a text area from the document. The dimension of a page cannot exceed the dimension of a sheet of paper, and the dimension of text area cannot exceed the dimension of a page. Crop markers 288 show where the paper will be trimmed for the final book.

15 A field 292 displays the book size corresponding to the chosen scaling, and a field 293 displays the paper size on which the document will be printed.

20 A field 294 is a scaling field in which the operator moves the marker 294a to scale the pages of the document. If the operator moves the marker 294a to the right, the page size will increase, and if the marker 294a is moved to the left, the page size will decrease. In other embodiments of the present invention, the operator may input the exact amount scaling into a field for accepting the scaling level instead of using a marker, e.g., 0.95 or .60, etc.

25 As the operator moves the marker 294a, the Book Size value will change as long as there is a cover large enough to accommodate the scaled book size. While the operator moves the marker 294a, the application will calculate the smallest paper size on which the book can be printed and the smallest paper size for the cover based on the original document, scaling factor, and whether the document can be printed in the 2-up format. The document may be able to be printed in the 2-Up format. The Paper Size value may also change as the operator moves the marker

30

294a. As the operator moves the marker 294a, the layout 281 also dynamically changes to reflect the new dimensions of the paper, the page and the text area. However, if the operator moves the marker 294a to the right and scale the document page to be larger than the available paper size, the application will automatically
5 decrease the margins around the text area because the document page is being scaled larger than the piece of paper on which it will be printed, but the application will not allow the margin to be less than 0.2 inch.

The scaling also takes into consideration the fact that when a book is printed and bounded, the edges of the pages may be slightly trimmed, so the actual margins
10 may have to be slightly larger than the stated margins. Furthermore, the actual margin around an inner edge may have to be larger than the stated margin for the inner edge. The inner edge of a page is the edge that is attached to a spine of a book. Because binding takes up certain amount of space, the actual margin at the inner edge may need to be slightly larger than the stated margin for the inner margin.
15 For example, if the stated margin for the inner edge is 1 inch, the actual margin at the inner edge may have to be 1.5 inches because the binding process may take up 0.5 inch of space. The extra 0.5 inch compensates for the loss. In preferred embodiments of the present invention, the application takes such effects into consideration when the application is calculating scaling, margins and page sizes.
20 In other words, when a page is printed, the margin at the inner edge may be slightly larger than the stated margin for the inner edge so that when the document is bounded into a book form, the inner margin will match the stated margin.

Fields 295, 296, 297 and 298 display the top margin, bottom margin, inside margin and the outside margin of the text area, respectively. Clicking on the
25 "Recommend Size" button 299 returns all settings to the default setting.

If the operator selected Print "2-Up" Yes back in the PDF Info screen 220, the application will try to fit the document on a piece of paper printed in the 2-up format. If the operator selected Print "2-Up" No, the application will not try to print the document in the 2-up format.

30 Typically, the 2-up format involves printing two identical book pages (e.g., two of page 6 of the book) on the same side of a single sheet of paper. In the preferred

embodiment, the present invention rotates one of the book pages 180° so that the binding edges of the two pages are proximate and at the center of the sheet. When the sheet is cut at the middle, the binding edge of each book page is formed by the cut. Therefore, the distance from the center of the sheet to the text of one of the book pages constitutes the margin of that book page on the binding edge.

Basically, the Scaling screen 280 allows the operator to conveniently scale the size of the pages in the book so that the operator can form different sized books based on the availability of the cover sheets or on the customer's preference.

The operator may click on the Back button 286 to move back to the previous screen or click on the Next button 287 to move to the next screen.

After scaling is finished, the application calculates all necessary parameters for the book binding job and displays the final calculated parameters in a Job Summary screen 300, as shown on step 204.

15 Job Summary

Figure 6 illustrates the Job Summary screen 300 divided into two sections, 305 and 310. The section 305 provides useful information and instruction about the Job Summary screen 300. The section 310 displays the summary of final parameters. The upper part of the section 310 displays the summary of the following parameters: Name, Date, Selected File, Finished Book Size, Scaling, Top Margin, Bottom Margin, Inside Margin, Outside Margin and Comments. Other information not shown in Figure 6 can also be provided on the Job Summary screen. For example, the Job Summary screen can show the effective margins (i.e., the margins remaining after the book is trimmed) or the amount the book is to be trimmed on each of the unbounded edges.

The lower part of the section 310 displays a drawing 314 of the cover template. The drawing also displays the dimension of the cover, including the width, height and thickness of the spine. The application calculates the dimension of the cover based on the types of paper used and on the number of pages for each type of paper.

When the operator clicks the Create PDFs button 316, a simple directory selection dialog will let the operator enter the name of the directory where the following three PDF files will be stored: the first file is a PDF file of the scaled document that when printed forms the internal pages of the final book; the second
5 file is a PDF file of the cover template for the book that when printed forms the cover of the final book; and, the third file is a PDF file of the job summary. The name of the directory appears in a directory name field 317. The default directory will be the C:\windows\desktop directory when the application is running on a PC. When the application is running on a McIntosh computer, the default directory will be the
10 Desktop Folder.

The application will then create a directory under the chosen directory in which the three PDF output files will be written. The directory name will be the first 8 non-whitespace letters and numbers of the customer name with the number of seconds since Jan 1, appended to it. For example, if the operator had entered the
15 following string in the Name field 231 on the PDF Info screen 220:

23John\$%^ Smith's File

the application would create a new directory with a name like this:

23JohnSm315360000

The operator may click on the back button 318 to go back to the previous
20 screens.

The PDF file of the scaled document is created based on the information collected from the operator on the PDF Info screen 220, the Page Info screen 250 and the Scaling screen 280. The file basically contains the content and the printing instruction for the document that forms the internal pages of the book.

25 In the preferred embodiment, the new PDF file is created by placing a transformation matrix on each page of the preexisting PDF file. The term "transformation matrix" is well known in the art of computer graphics and computerized publishing. The transformation matrix scales and repositions the content on the page as appropriate for the printing and binding of the book. If the
30 book is to contain content on both sides of the page, the content on the odd numbered pages is generally shifted to the left and the content on the even

numbered pages is generally shifted to the right. In other words, the content is shifted toward the edge to be bounded. Typically, the book will be trimmed on each of the non-bounded edges after the book is bound so the content is shifted so as to leave extra room for the trimming.

5 Fig. 7 illustrates a print out of a job summary file 400 in accordance with an embodiment of the present invention. The summary file 400 lists the parameters and the values for the Original PDF file, the Book Profile, the Bound Book, the Printing Information, PDF Files and the Cover Layout.

10 After the application has stored the three PDF output files, the operator may print the scaled document file to form the internal pages of the book and the cover template file to form the cover of the book. Before the operator prints out the cover, the operator may edit the PDF cover template file to add such items as the title and/or the author's name to the cover so that the cover will be printed with the title and/or author's name. Other information or drawings may be added to the cover by
15 editing the PDF cover template file. The operator may have to physically trim the print out of the scaled document file along the crop marks determined by the application so that the cover of the book can perfectly bind the document print out. The operator may use various techniques known in the art to attach the cover to the document print out to form a book. For example, in one perfect binding method, the
20 left side of the stack, the spine, is trimmed to get rid of the folds and expose the edge of each page. Glue for perfect binding is applied along the spine and when the cover is pressed against the wet surface with glue, the cover adheres to the pad. After the glue is dry, the assembled book is trimmed on the remaining three sides.

 It should be understood that the present invention also relates to
25 machine readable media on which are stored (encoded) program instructions for performing the methods of this invention. Such media include, by way of example, magnetic disks, magnetic tape, optically readable media such as CD ROMs, semiconductor memory such as PCMCIA cards, etc. In each case, the medium may take the form of a portable item such as a small disk, diskette, cassette, etc., or it
30 may take the form of a relatively larger or immobile item such as a hard disk drive or RAM provided in a computer.

In the following claims, those elements which do not include the words "means for" are intended not to be interpreted under 35 U.S.C. § 112 ¶ 6.

CLAIMS

1. A method of formatting and binding a document to form a book, said method comprising the steps of:
- 5 (a) collecting information about an input file containing the document;
- (b) collecting printing instructions for each set of page ranges from the document as specified by an user;
- (c) formatting pages in the page ranges based on the printing instructions and the input file information;
- 10 (d) creating a cover template file containing a dimension of a cover for the book based on the printing instructions and the formatted pages; and
- (e) creating a printing master file containing the formatted pages.
2. The method of claim 1, further comprising the steps of:
- 15 printing the cover template file to create the cover of the book; and
- printing the printing master file to create internal pages of the book.
3. The method of claim 2, further comprising the step of:
- binding the cover around the internal pages to create the book.
- 20 4. The method of claim 1, further comprising the steps of:
- scaling the pages of the book; and
- formatting the pages based on the scaling of the pages.
- 25 5. The method of claim 4, wherein said step of scaling the pages changes text areas of the pages.
6. The method of claim 5, wherein said step of scaling the pages changes margins around the text areas of the pages.
- 30 7. The method of claim 4, wherein said step of scaling is based on a size of the cover.

8. The method of claim 4, wherein said information includes margins around text areas of the pages.

5 9. The method of claim 4, further comprising the step of:
specifying beginning and ending pages for the each set of the page ranges.

10 10. The method of claim 9, wherein said printing instructions include type of paper for the each set of the page ranges and printing side format.

11. The method of claim 10, wherein said printing instructions further include whether the pages should be printed in a 2-up format.

15 12. The method of claim 11, wherein said formatting is based on a size of an available cover sheet.

20 13. The method of claim 1, further comprising the step of:
creating a job summary file summarizing various parameters in the cover template and the printing master files.

14. The method of claim 1, further comprising the step of:
retrieving the input file.

25 15. Computer-executable process steps stored on a computer readable medium, said process steps for automation of formatting and binding of a document to form a book, said process steps comprising the steps of:

(a) collecting information about an input file containing the document through a computer generated input file user interface screen;

30 (b) collecting printing instructions for each set of page ranges from the document as specified by an user through a computer generated page information user interface screen;

(c) formatting pages in the page ranges based on the printing instructions and the input file information;

(d) creating a cover template file containing a dimension of a cover for the book based on the printing instructions and the formatted pages; and

5 (e) creating a printing master file containing the formatted pages.

16. The process steps of claim 15, further comprising the steps of:
scaling the pages of the book; and
formatting the pages based on the scaling of the pages.

10

17. The process steps of claim 16, wherein said step of scaling the pages changes text areas of the pages.

18. The process steps of claim 17, wherein said step of scaling the pages
15 changes margins around the text areas of the pages.

19. The process steps of claim 16, further comprising the step of:
creating a job summary file summarizing various parameters in the
cover template and the printing master files.

20

20. Computer-executable process steps stored on a computer readable medium, said process steps for automation of formatting and binding of a document to form a book, said process steps comprising the steps of:

25 (a) generating an input file user interface screen for inputting information about an input file containing the document;

(b) collecting and processing the information;

(c) generating a page information user interface screen for inputting printing instructions for each set of page ranges from the document;

30 (d) collecting and processing the printing instructions;

(e) formatting pages in the page ranges based on the printing instructions and the input file information;

(f) creating a cover template file containing a dimension of a cover for the book based on the printing instructions and the formatted pages; and

5 (g) creating a printing master file containing the formatted pages.

21. The process steps of claim 20, further comprising the steps of:
generating a scaling user interface screen for inputting scaling
specification of the pages; and

10 formatting the pages based on the scaling specification.

22. The process steps of claim 21, further comprising the step of:
dynamically changing a display of a page layout based on the scaling
specification.

15

23. The process steps of claim 20, further comprising the step of:
creating a job summary file summarizing various parameters in the
cover template and the printing master files.

20 24. An apparatus for automation of formatting and binding of a document
to form a book, comprising:

a processor for executing stored program instruction steps; and

a memory connected to the processor for storing the program
instruction steps,

25 wherein the program instruction steps include steps of:

(a) collecting information about an input file containing the
document through a computer generated input file user interface screen;

(b) collecting printing instructions for each set of page ranges from
the document as specified by an user through a computer generated page
information user interface screen;

30 (c) formatting pages in the page ranges based on the printing
instructions and the input file information;

- (d) creating a cover template file containing a dimension of a cover for the book based on the printing instructions and the formatted pages; and
- (e) creating a printing master file containing the formatted pages.

- 5 25. An apparatus for automation of formatting and binding of a document to form a book, comprising:
- a processor for executing stored program instruction steps; and
 - a memory connected to the processor for storing the program instruction steps,
- 10 wherein the program instruction steps include steps of:
- (a) generating an input file user interface screen for inputting information about an input file containing the document;
 - (b) collecting and processing the information;
 - (c) generating a page information user interface screen for inputting
 - 15 printing instructions for each set of page ranges from the document;
 - (d) collecting and processing the printing instructions;
 - (e) formatting pages in the page ranges based on the printing instructions and the input file information;
 - (f) creating a cover template file containing a dimension of a cover
 - 20 for the book based on the printing instructions and the formatted pages; and
 - (g) creating a printing master file containing the formatted pages.

26. A system for formatting and binding a document to form a book, said system comprising:
- 25 means for collecting information about an input file containing the document;
- means for collecting printing instructions for each set of page ranges from the document as specified by an user;

means for formatting pages in the page ranges based on the printing instructions and the input file information;

means for creating a cover template file containing a dimension of a cover for the book based on the printing instructions and the formatted pages; and

5 means for creating a printing master file containing the formatted pages.

27. The system of claim 26, further comprising:

means for scaling the pages of the book; and

10 means for formatting the pages based on the scaling of the pages.

28. The system of claim 26, further comprising:

means for creating a job summary file summarizing various parameters in the cover template and the printing master files.

15

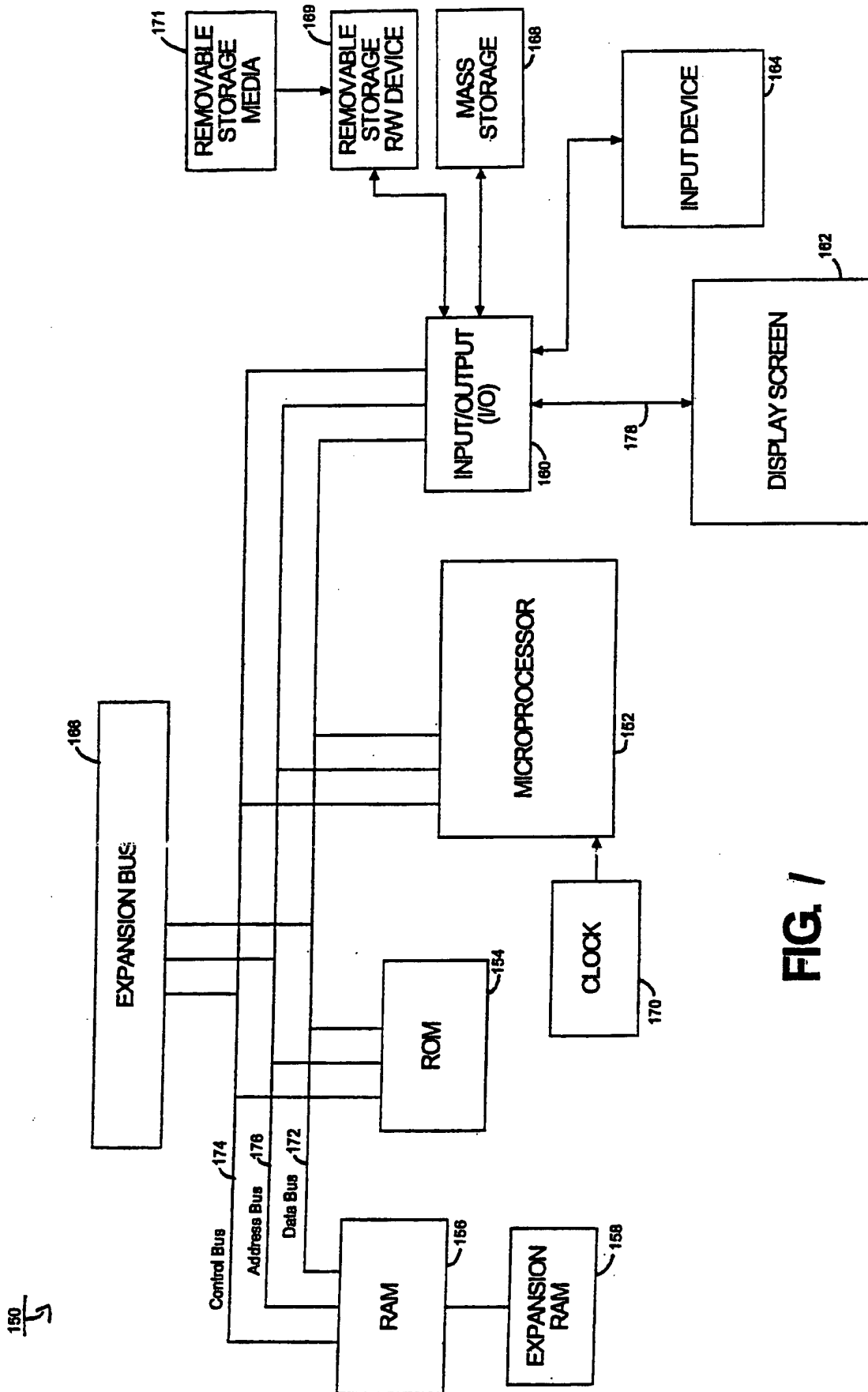


FIG. 1

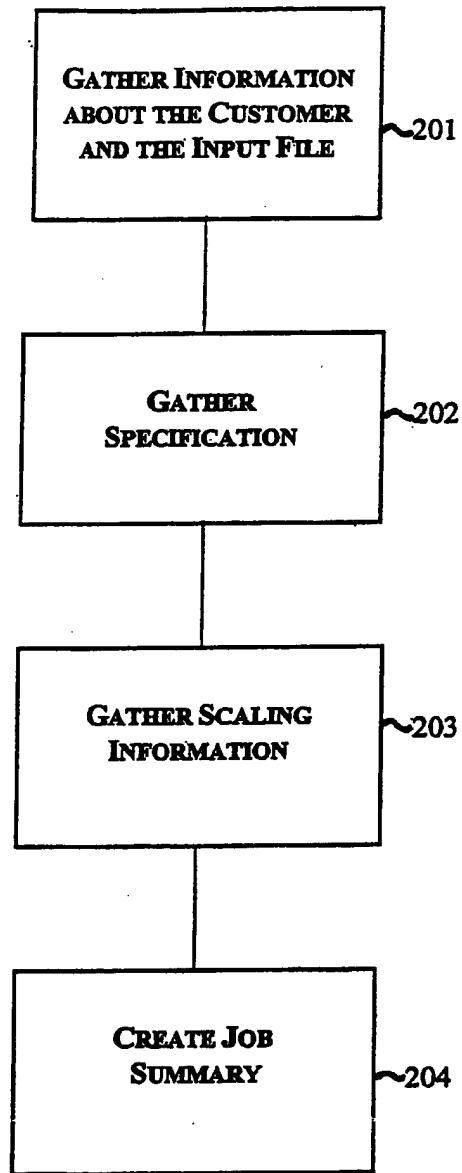


FIG. 2

Perfect Bind

PDF Info

Name: Who is this order for?
 Select File: Type in file name or select browse to find the file you want to select.

Units: Select U.S. or Metric measurements.
 Original Size: The selected PDF document size.
 Margins: Enter the selected PDF margins.
 Print '2 Up': If 'Yes' pages may print 2-up. If 'No' pages will not print 2-up.
 Originals printed 2-up require that the insides and cover be trimmed prior to binding.

Max. Cover Size: The largest size available for printing cover.

PDF Info | **Page Info** | **Scaling** | **Summary**

Name:

Select File:

Units:

Original Size: 8 in. wide x 11 in. tall

Margins:

Print '2 Up': ☒ Yes ☐ No

Max. Cover Size:

Fig 3

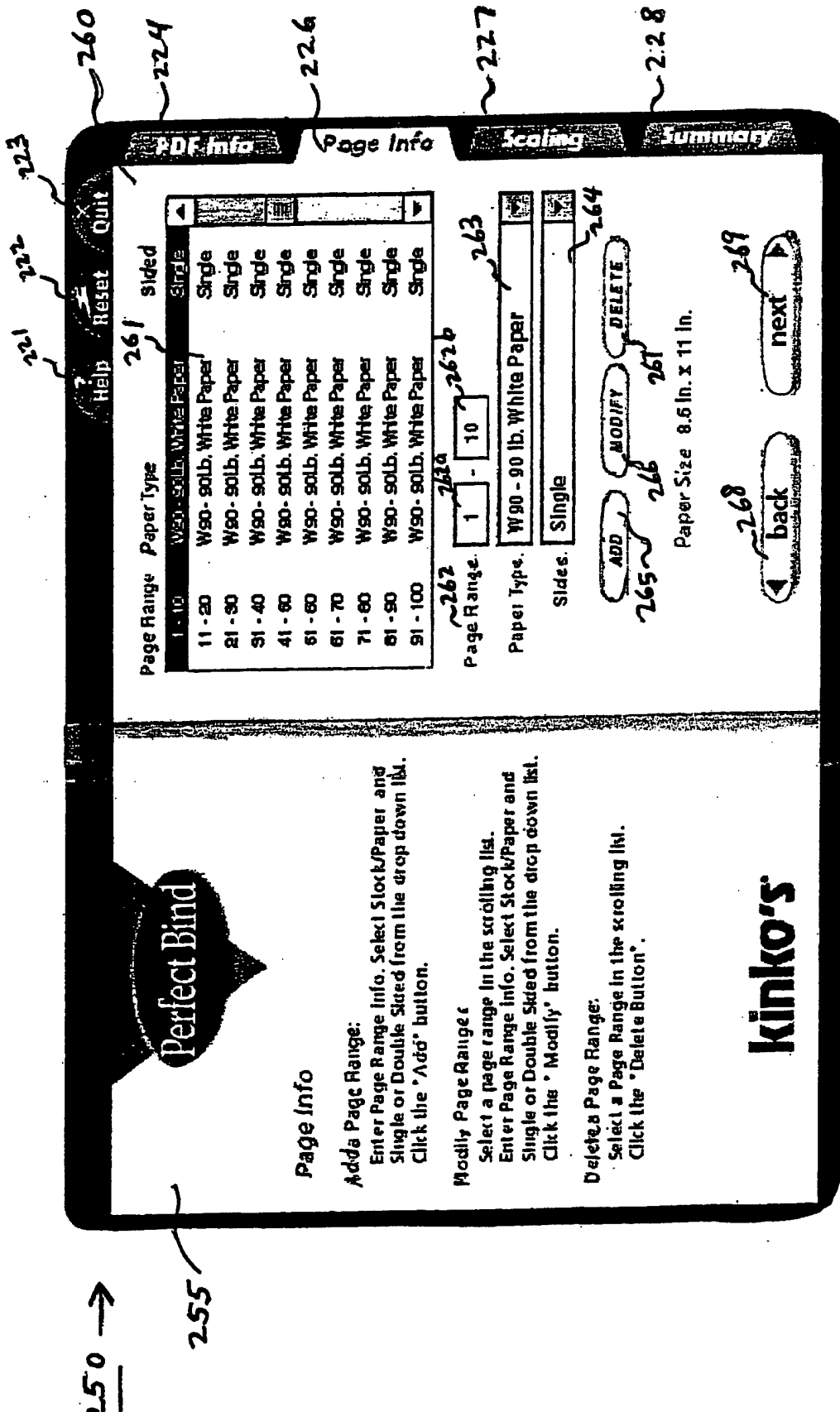


Fig. 4

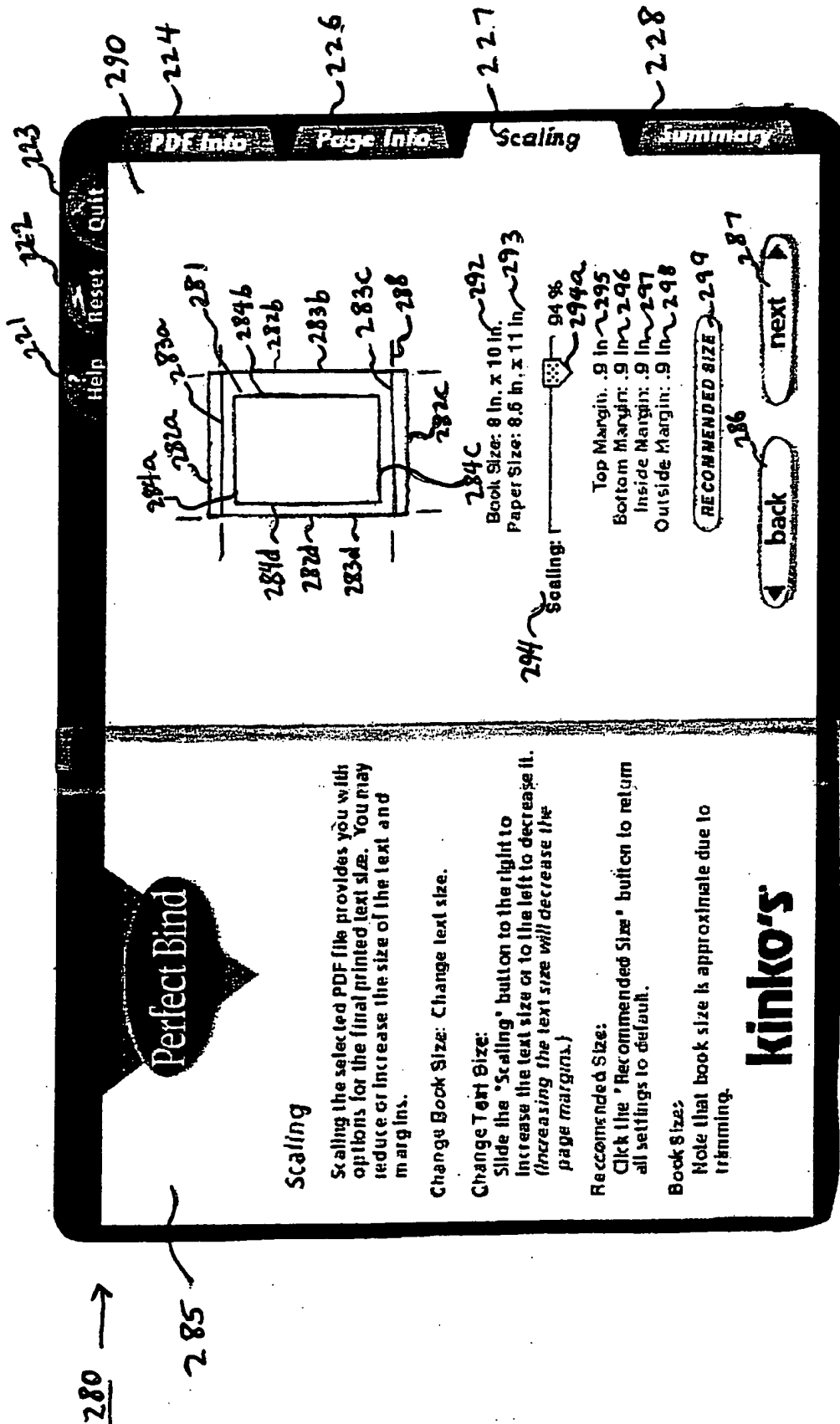


Fig 5

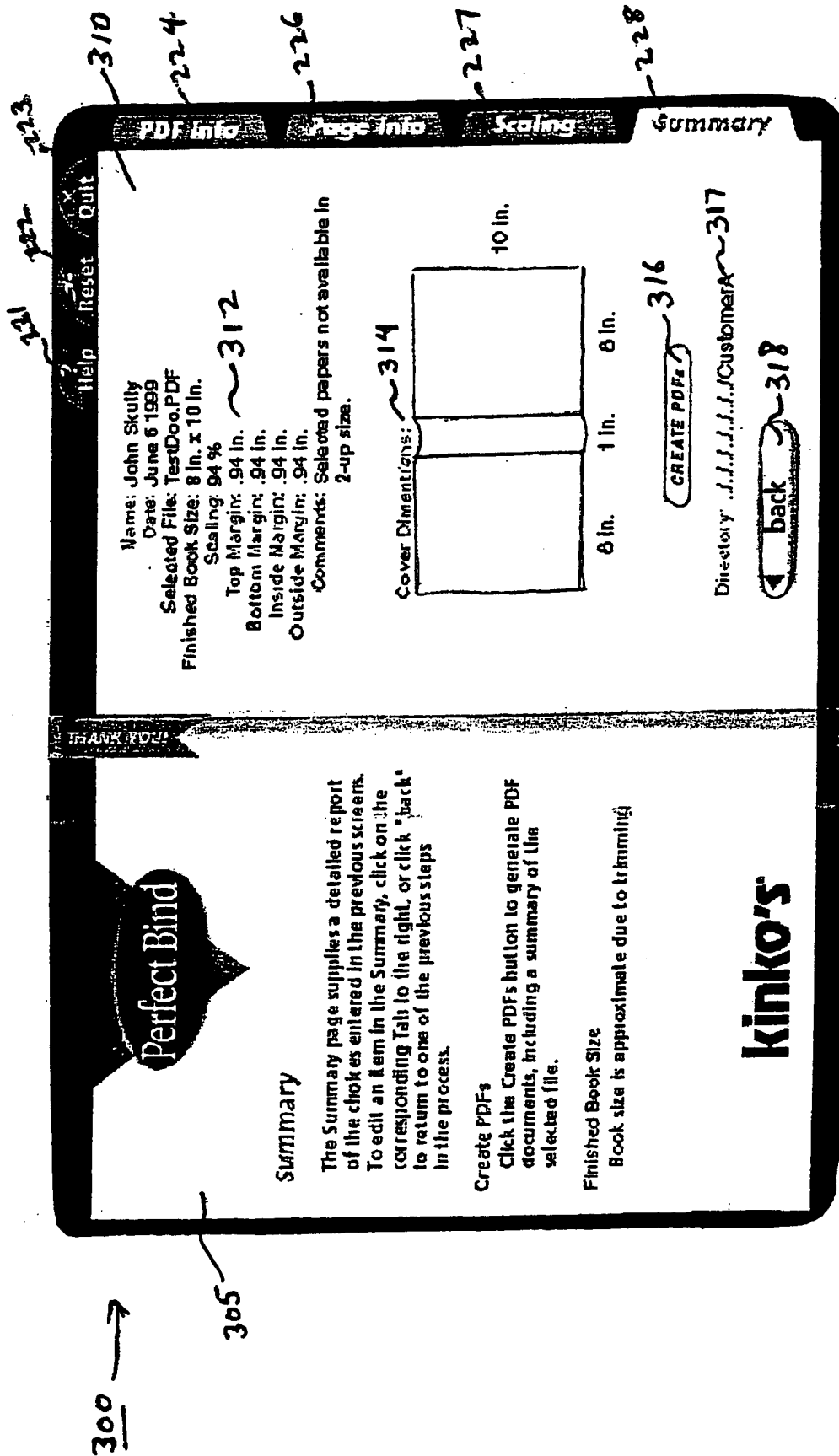


Fig. 6

Perfect Bind Job Details

Customer Name: axxxx

Date: 21 May 1999

Original PDF

File name: aportrait200.pdf
Number of pages: 200
Layout Size: 8.50 in. wide
 11.00 in. tall
Layout Margins: 1.00 in. top
 1.00 in. bottom
 1.00 in. left
 1.00 in. right

Book Profile

Source page range
 1-200

Paper Type
 R100 - 100% Chlorine Free Paper

Sides Printed
 Double

Printing Information

Stock Size (pages): 8.50 in. wide
 11.00 in. tall
Layout (pages): 1-up
Stock Size (cover): 11.00 in. wide
 17.00 in. tall

PDF Files

Job Summary: summary.pdf
Book Contents: book.pdf
Cover Template: coverlayout.pdf

Bound Book

Location of files: axxxx12132564
Finished size: 7.74 in. wide
 10.01 in. tall
Scaling factor: 91.0%
Effective margins: 0.91 in. top
 0.91 in. bottom
 0.91 in. left
 0.91 in. right

Cover Layout

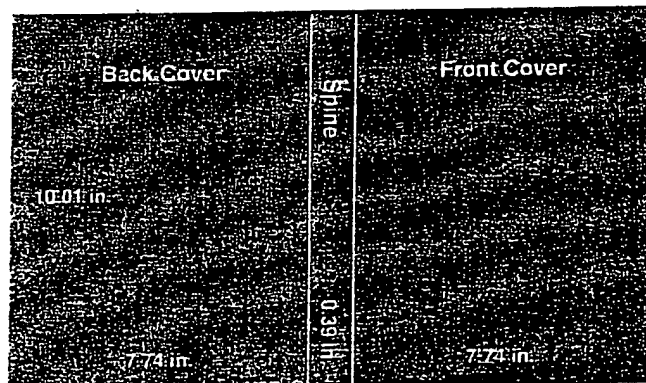


FIG. 7